

2.0 TRAFFIC AND ACCIDENT DATA

2.1 Traffic Analysis

2.1.1 Roadway Characteristics

The rural portion of US 60 from Superior (MP 223.8) to Miami (MP 243.6) traverses a scenic mountainous area that is generally within the Tonto National Forest. Private property is adjacent to US 60 in the Top of the World area located near the County line and in the Globe-Miami area (See **Figure 1-2**). Mining activities are prevalent along US 60 including Oak Flat, Pinto Valley and in Miami. The roadway is 38 to 40 feet wide with a 12-foot travel lane in each direction and 7-8 foot wide shoulders except on the steep (6%) grade sections. In these sections, the roadway has been restriped to provide climbing lanes including the Queen Creek Canyon area (MP 228.0 to MP 230.3), in the Devils Canyon/Iron Canyon section (MP 232.7 to MP 234.2), Pinto Creek (MP 236.4 to MP 238.0), and from MP 239.6 to MP 240.9. The shoulder width is only 1- 2 feet in the climbing lane sections. The posted speed limit varies from 50 mph in the Queen Creek Canyon section to 55 mph for most of the segment and is reduced to 45 mph approaching Miami. Many of the horizontal curves are posted with speed advisory signs indicating speeds less than the route posted speed limits.

The urban part of US 60 in the Globe-Miami area (MP 243.65 to MP 252.23) is a curbed urban section consisting of 4 or 5-lanes with numerous intersections and driveways. The roadway width varies from 52 feet to 78 feet and has a raised median from MP 244.8 to 246.8. On-street parallel parking is permitted in downtown Miami. US 60 is referred to as Live Oak Street in Miami, Main Street in Claypool, and Broad Street, Willow Street, and Ash Street in Globe. The posted speed limit varies from 30 mph to 45 mph. There are 13 signalized intersections including Reppy Avenue, Forest Avenue, Keystone Avenue, Miami Avenue, New Street, Walmart/Safeway entrance, SR 188, Smiths shopping center, Main Street/Escudilla Drive, Broad Street, Hill Street, Third Street, and at US 70.

US 60 east of the intersection with US 70 (MP 252.2 to MP 258.0) begins as a curbed urban section consisting of 4 or 5-lanes which can be best described as urban transition area that transitions to a two-lane rural section at MP 252.82. The two-lane section then continues to the east for the balance of the study. The posted speed limit is 55 mph.

2.1.2 Study Methods/Tools

Highway Capacity Software (HCS), HCS Two-Lane Highway Version 4.1d and HCS 2000 Multilane Highway Version 3.1b, were used to perform highway segment analysis consistent with the methodology outlined in the *HCS 2000 Highway Capacity Manual*. For the analysis of two-lane highways, the level of service (LOS) is a function of operating speeds, time delays, and passing sight distance. Multilane highway level of service is a function traffic density – the ability for motorists to maneuver in the traffic stream. For urban multilane streets, the signalized intersections control the capacity of the roadway and level of service is a function of delay. Only the roadway section level of service is considered in this report.

Tables 2-1 and 2-2 briefly describe the different levels of service for two-lane highways and for multilane highways.

Table 2-1 Levels of Service for Two-Lane Highways

Level of Service	Two-Lane Highways
A	Average speeds approach 60 mph and passing frequency is not demanding
B	Average speeds of 55 mph can be expected and passing demand becomes significant to maintain speeds; demand equals capacity
C	Noticeable increases in platoon formations with average speeds of 52 mph; flow is stable but susceptible to congestion due to
D	Average speeds of 50 mph with unstable traffic flow; passing becomes impossible as demand exceeds capacity
E	Average speeds are below 50 mph with passing virtually impossible
F	Disturbances in flow cause LOS E to rapidly degenerate to LOS F

Table 2-2 Levels of Service for Multilane Highways

Level of Service	Multilane Highways
A	Free-flow conditions with minor disruptions easily absorbed
B	Average speeds are same as LOS A speeds, but ability to maneuver decreases
C	Affect of density on traffic flow is noticeable; minor disruptions may cause localized deterioration in service
D	Traffic congestion seriously impedes motorists ability to maneuver; minor disruptions cause service to deteriorate to LOS

Level of Service	Multilane Highways
E	Operations are at or near capacity; flow is unstable and susceptible to queuing
F	Flow breaks down; vehicles experience stop-and-go movements

Two-Lane Highways – Ideal conditions for two-lane highways as outlined in the *Highway Capacity Manual* are defined by the following characteristics:

- Capacity of 2,800 passenger cars per hour per lane
- Design speeds greater than or equal to 60 mph
- Lane widths greater than or equal to 12 feet
- Clear shoulder width of 6 feet or more
- No “No Passing Zones”
- All passengers cars in the traffic stream
- A 50/50 directional split of traffic
- No impediments to through traffic due to either traffic control or turning vehicles
- Level terrain

Multilane Highways – Ideal conditions for multilane highways as described in the *Highway Capacity Manual* are defined by the following:

- Capacity of 2,200 passenger cars per hour per lane
- Free flow speeds of 60 mph or greater
- Level Terrain
- Lane widths greater than or equal to 12 feet (left side plus right side along a roadway in one direction of travel)
- Total lateral clearance greater than or equal to 12 feet from the edge of traveled way to obstructions on the edge of pavement or the median
- No direct access points along the roadway
- Divided highway
- Only passenger cars in the traffic stream

Ideal highway capacity is adjusted to an actual capacity based on actual roadway characteristics. HCS uses information such as peak hour factor, directional split, heavy vehicle percentages, lane widths and clearances, and access points per mile to determine a roadway's ability to move traffic for actual or real conditions.

It has been determined for the project study corridor that existing levels of service C or better are acceptable operating conditions. Levels of service D or worse represent unacceptable operating conditions for this facility. For the proposed improvements, the desired level of service for the rural portion of the highway is B while the urban section design level of service is C. (See ADOT Roadway Design Guidelines table 103.2A)

2.1.3 Traffic Study Segments

For the purposes of the traffic study, the US 60 corridor was subdivided into eight (8) different study segments (See **Figures 2-1 and 2-2**). The study segment limits were set based on the existing traffic characteristics, roadway widths, number of lanes, functional classification, horizontal and vertical alignment, topography and access conditions.

Segment 1

MP 226.85 to MP 242.82 – Begins at the SR 177 underpass at the eastern edge of Superior and ends at the Bluebird Mine Road intersection west of Miami. It consists of a rural minor arterial, 2-lane highway traversing mountainous terrain. Two-thirds of the length is designated no-passing zones. The segment includes the Queen Creek Bridge and Tunnel, Queen Creek Canyon, Oak Flat area, Devils Canyon, Iron Canyon, the Top of the World area, and the Pinto Creek Bridge. US 60 crosses the County line from Pinal County and into Gila County and the Tonto National Forest east boundary at MP 241.6. Segment 1 also includes several climbing lane sections. These sections were created by restriping the roadway to provide two uphill lanes and one downhill lane. The climbing lane sections are from MP 228.0 to 230.3, 232.7 to 234.2, 236.4 to 238.0, and from 239.6 to 240.9.

Segment 2

MP 242.82 to MP 243.65 – Begins at Bluebird Mine Road and ends at the intersection of Turner Street. This segment is a 2-lane rural minor arterial in rolling terrain. The entire length of the segment is designated as a no-passing zone. Near the eastern end of the segment, the roadway width transitions from 38 feet wide to 64 feet wide to provide for 2 travel lanes in each direction immediately east of the segment.

Segment 3

MP 243.65 to MP 244.66 – Consists of an urban principal arterial beginning near Turner Street and Live Oak Creek at the western edge of Miami and ending at Latham Blvd. in the eastern section of Miami. This 64-foot wide section includes 2-lanes of traffic in each direction and curbside parallel parking. Existing development along US 60 is generally commercial, except for the area west of Reppy Street that consists of older homes. Many existing buildings are located right on the back of sidewalk or very close to it especially near the intersection of Keystone Avenue. There are over 40 driveways on each side of this segment and 11 intersecting streets including Turner Street on the west end of the segment and Latham Blvd. on the east end. There are four signalized intersections: Reppy Avenue, Forest Avenue, Keystone Avenue/Adonis Avenue, and Miami Avenue. The terrain in the segment is level and generally slopes down from west to east.

Segment 4

MP 244.66 to MP 247.06 – Consists of an urban principal arterial roadway with a raised median and 2 through traffic lanes in each direction. It begins near the eastern limits of the Town of Miami and ends at the intersection of SR 188. This segment passes through the unincorporated area of Claypool. A majority of the development along this segment consists of Cyprus Miami Mining Company facilities. Eastern portions of the segment consist of commercial development along the south side including Walmart and Safeway. There are about 20 driveways per mile on the south side and approximately 10 per mile on the north side and 13 intersections. There are three signalized intersections on this segment: New Street, SR 188/Russell Road, and the Walmart/Safeway entrance. There are two railroad crossings – one at Hill Street (MP 245.25) and the other is located at SR 188 (MP 247.06).

Segment 5

MP 247.06 to MP 249.60 – Begins at the signalized intersection of SR 188 and ends at Collins Street. It is classified as a urban principal arterial. The roadway section consists of 2 through traffic lanes in each direction with a continuous flush left-turn lane and right-turn lanes or auxilliary lanes along the businesses in the area. Curb and gutter also has been installed adjacent to the right-turn lanes along the new businesses. This segment is located in the western edge of the City of Globe and is lined with businesses such as Smiths grocery store, fast food restaurants, gas stations, and car dealerships. There are about 20 driveways per mile on the south side of US 60 and approximately 10 per mile on the north side. There are signalized intersections at the Smith's entrance and the Main Street/Escudilla Drive intersection. Terrain in this segment is rolling and generally slopes up from the west to the east.

Segment 6

MP 249.60 to MP 250.05 – Begins at Collins Street and ends at the signalized intersection of Broad Street in Globe. The roadway section consists of two lanes of through traffic in each direction and a paved continuous left turn lane. This segment is also an urban principal arterial. The segment is located in an older commercial area of Globe with over 40 driveways on each side of the roadway. The only traffic signal in this segment is located at the intersection of Broad Street

Segment 7

MP 250.05 to MP 251.94 – Consists of an urban principal arterial in Central Globe beginning at Broad Street to McMillan Wash near the eastern edge of Globe. It is a 5-lane facility with a continuous left turn lane. This segment includes the Maple Street overpass and the Globe Viaduct crossing of Pinal Creek, Broad Street and the railroad tracks. Development along the US 60 roadway is a mix of older commercial establishments and residential properties. Many of the buildings are located at the back of sidewalk or very close to it. There are approximately 30 driveways per mile on each side of the roadway and 21 intersections. Two of the intersections are signalized: Hill Street/Devereux Street and 3rd Street. US 60 is also known as Willow Street from Broad Street to Hill Street and Ash Street east of Hill Street. The terrain is considered rolling with the general grade sloping up to the east.

Segment 8

MP 251.94 to MP 252.23 – Begins at McMillan Wash Bridge and ends at the junction with US 70 in eastern Globe. Segment 8 is also classified as an urban principal arterial and includes 2 lanes of through traffic in each direction and a continuous left turn lane. Development adjacent to US 60 in this segment consists of newer businesses including several fast food restaurants, motels, and gas stations. There are about 20 driveways per mile on each side of this segment and two intersections. The intersection at US 70 is signalized.

Segments 9 and 10

MP 252.23 to MP 258 – These segments continue the rural principal arterial of US 60 towards Show Low, beginning at the intersection with US 70. Segment 9 ends at MP 252.82 where the four-lane undivided roadway section ends, with Section 10 continuing to the end of the study limit with a rural 2-lane section.

2.1.4 Traffic Data

The Arizona Department of Transportation (ADOT) Transportation Planning Division provided traffic volume data for existing and future design year conditions. The existing traffic volume information is based on traffic loop counters located at MP 226.2, MP 234.8, 243.2, 244.0, 244.7, 245.10, 247.3, 249.7, 250.3, 250.7, 251.95 and MP 252.5.

The annual average daily traffic (AADT), peak hour factors (K), directional splits (D), and truck (T) percentages for the years 1998 to 2002 and design year 2025 ADT were provided by ADOT. The K, D, and T factors were assumed to be the same for both the existing traffic volumes and the design year 2025 traffic volumes. The K factor was used to determine peak hour volumes (PHVs). Study (1998), current (2002), and future year traffic volumes for each segment are shown in **Table 2-3** and in **Figures 2-1 and 2-2** (shown on previous 2 pages).

Table 2-3 Roadway Segments Average Daily Traffic and Peak Hour Volumes

Roadway Segment	ADT (vehicles per day)		PHV (vehicles per hour)		Growth Rate per Year
	1998	2025	1998	2025	
1 – MP 226.85 to MP 242.82	7,044	15,500	845	1,860	2.97%
2 – MP 242.82 to MP 243.65	10,795	24,000	1,295	2,880	3.00%
3 – MP 243.65 to MP 244.66	10,200	24,000	1,224	2,880	3.22%
4 – MP 244.46 to MP 247.06	19,800	46,000	1,782	4,140	3.17%
5 – MP 247.06 to MP 249.60	21,120	51,000	1,901	4,590	3.32%
6 – MP 249.60 to MP 250.05	23,420	55,000	2,108	4,950	3.21%
7 – MP 250.05 to MP 251.94	13,810	29,667	1,519	3,263	2.87%
8 – MP 251.94 to MP 252.23	16,300	34,000	1,793	3,740	2.76%
9 – MP 252.23 to MP 252.82	5,540	7,000	997	1,260	2.00%*
10 – MP 252.82 to MP 254.50	5,540	7,000	997	1,260	2.00%*

* For Segments 9 and 10, a minimum 2.00% growth rate was used based on a 2002 ADT of 4,450 vpd.

The future growth rates are comparable to the average growth rate per year from 1993 to 1998 as shown in **Table 2-4**. The largest increases occur in western Globe, an area that has experienced significant business development whereas the smallest traffic increase is in Miami where no growth has occurred. Existing roadway characteristics for each segment are summarized in **Table 2-5**.

Table 2-4 Average Growth Rates

Roadway Segment	1993	1998	Growth Rate Per Year
1	6,044	7,044	3.11
2	10,499	10,795	0.55
3	9,715	10,200	0.98
4	15,350	19,800	5.22
5	14,446	21,120	7.89
6	21,724	23,420	1.51
7	12,682	13,810	1.72
8	14,541	16,300	2.31
9	5,260	5,540	1.01
10	5,260	5,540	1.01
Avg.			2.70

Table 2-5 Roadway Characteristics

ROADWAY CHARACTERISTICS	SEGMENT									
	1	2	3	4	5	6	7	8	9	10
Design Hour Factor (K)	14	14	14	14	14	14	14	13	18	18
Directional Factor (D)	51	51	51	51	51	51	51	50	52	52
Truck Percentage (T)	15	15	15	15	15	15	15	15	16	16
RV Percentage (RV)	2	2	2	2	2	2	2	2	2	2
No Passing Percentage	78	100	-	-	-	-	-	-	-	90%
Peak Hour Factor (PHF)	0.93	0.94	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Design Speed (mph)	60	60	40	45	50	40	40	50	50	50
Terrain	M	R	L	L	R	R	R	R	R	R
Typical Section	2-lane	2-lane	4-lane	5-lane	5-lane	5-lane	5-lane	5-lane	5-lane	2-lane

L – Level, R – Rolling, M – Mountainous

2.1.5 Level of Service Results

Current Conditions

The estimated levels of service for the eight roadway segments under existing (2002) peak hour conditions are presented in **Table 2-6** and are shown in **Figures 2-3 and 2-4**.

Table 2-6 Current Levels of Service

Roadway Segment	Existing LOS
1 – MP 226.85 to MP 242.82	E
1A – Climbing lane section	A/E
2 – MP 242.82 to MP 243.65	F
3 – MP 243.65 to MP 244.66	B/A
4 – MP 244.46 to MP 247.06	B/A
5 – MP 247.06 to MP 249.60	B/B
6 – MP 249.60 to MP 250.05	C/C
7 – MP 250.05 to MP 251.94	B/B
8 – MP 251.94 to MP 252.23	B/B
9 – MP 252.23 to MP 252.82	A/A
10 – MP 252.82 to MP 254.50	D

B/B – Level of service for each direction on multilane highway

2025 Future Conditions

Future condition levels of service were estimated based on future traffic volume projections. The roadway characteristics were assumed to be the same for the 2025 design hour as they currently exist. The results of this analysis provided an estimation of future traffic operations under “no build” conditions. Levels of service for year 2025 conditions are presented in **Table 2-7** and are shown in **Figures 2-3 and 2-4** (shown on the previous 2 pages).

Table 2- 7 Future Levels of Service

Roadway Segment	Future LOS
1 – MP 226.85 to MP 242.82	F
1A – Climbing lane sections	B/F
2 – MP 242.82 to MP 243.65	F
3 – MP 243.65 to MP 244.66	D/C
4 – MP 244.46 to MP 247.06	D/C
5 – MP 247.06 to MP 249.60	E/D
6 – MP 249.60 to MP 250.05	F/F
7 – MP 250.05 to MP 251.94	D/D
8 – MP 251.94 to MP 252.23	D/C
9 – MP 252.23 to MP 252.82	A/A
10 – MP 252.82 to MP 254.50	D

A/B – Level of service for each direction on multilane highway segments

Acceptable Operating Level of Service

According to acceptable operating criteria, Segments 1 and 2 indicate unacceptable operating conditions for the 2002 peak hour. The analysis for future conditions indicates that Segments 1 and 2 will operate at LOS F by the year 2025.

Segments 4, 5, 6, 7, and 10 will operate at or below LOS D by the year 2025. The earliest points after 2002 that each of these segments can be expected to degrade to LOS D are listed in **Table 2-8**. The corresponding volumes with which each of the segments will reach LOS D are also listed.

Table 2-8 Year Level of Service Expected to Degrade to LOS D

Roadway Segment	Year	Growth Rate per Year	Directional Peak Hour Volume (vehicles per hour)	Directional 1998 Peak Hour Volume (vehicles per hour)
4	2024	3.17%	1950	855
5	2020	3.32%	1910	912
6	2009	3.21%	1410	1012
7	2024	2.87%	1490	699

2.2 ACCIDENT ANALYSIS

2.2.1 Existing Accident Experience

Accident data was provided by ADOT. The data available from ADOT was for the time period December of 1998 through November 2003. The accident data was reviewed and analyzed in order to identify potential high accident locations or accident trends. Accident rates were derived for US 60 by segment and by milepost. The following equation was used to calculate the accident rates:

$$R_s = \frac{[\text{No. of Accidents} \times 10^6]}{[365 \text{ days} \times \text{No. of years of data} \times \text{Average Daily Traffic} \times \text{Length of Roadway Segment}]}$$

The units of this equation are in accidents per million vehicle miles travel (acc/MVM).

The statewide average accident rate for a rural two-lane highway was 0.79 acc/MVM and was 0.93 acc/MVM for an urban four-lane divided highway. These figures were reported by the ADOT Traffic Studies Section in 1994.

Figure 2-5 indicates the calculated highest annual accident rates by milepost. **Table 2-9** also summarizes the average annual accident rates calculated for US 60 segments over the last five years.

Table 2-9 US 60 Accident Rates for Study Segments

Roadway Segment	Begin Milepost	End Milepost	Segment Length (mile)	Number Accidents	Daily Entering Vehicles (vehicles per day)	Accident Rate (Acc/MVM)
1	226.85	242.82	15.97	335	6,830	1.68
2	242.82	243.65	0.83	12	11,290	0.70
3	243.65	244.66	1.01	42	13,690	1.68
4	244.66	247.06	2.40	167	18,450	2.07
5	247.06	249.60	2.54	178	21,390	1.80
6	249.60	250.05	0.45	10	23,520	0.52
7	250.05	251.94	1.89	23	14,270	0.47
8	251.94	252.23	0.29	21	11,620	3.42
9	252.23	252.82	0.59	3	5,020	0.55
10	252.82	254.50	1.78	8	5,020	0.49

Table 2-10 summarizes selected types of accidents that occurred on US 60 for the time period between December 1998 and November 2003.

Figure 2-5: 1998-2003, Accidents by Milepost

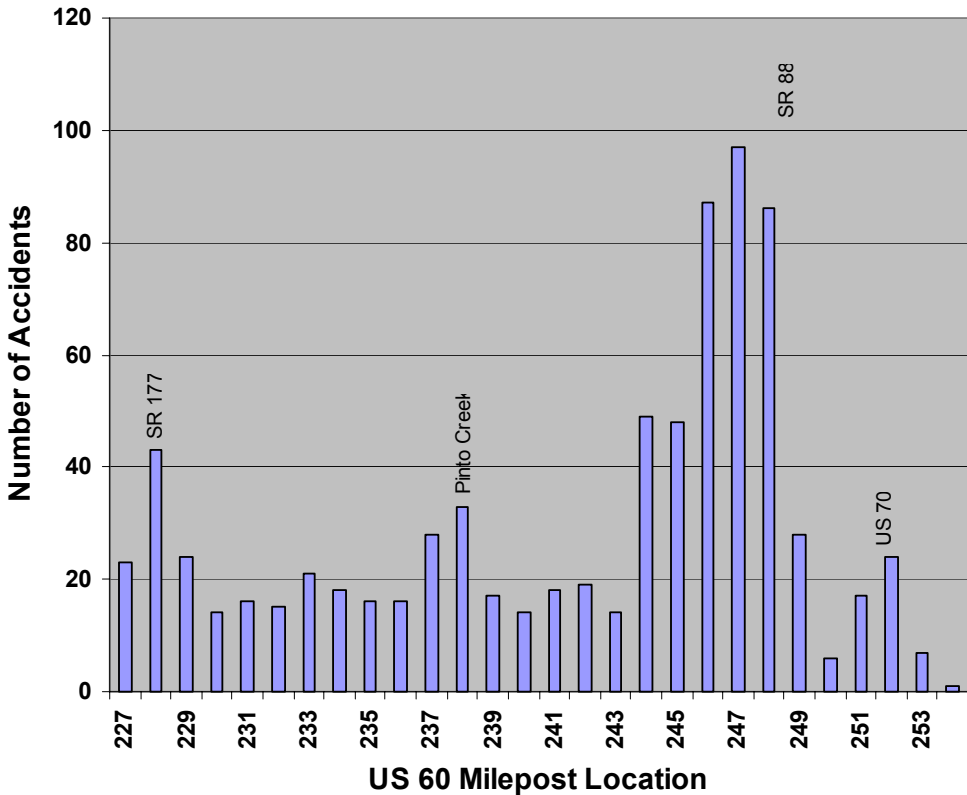


Table 2-9 (shown on the previous page) shows accident rates by segment. **Figures 2-6 and 2-7** show the highest accident rate locations.

Table 2-10 US 60 Accident Type Summary by Segment

Roadway Segment	Total Accidents	Single Vehicle	Angle	Rear Ends	Left Turn	Total Injuries	Total Fatalities
1	335	239	2	48	0	180	9
2	12	4	2	6	0	11	0
3	42	2	3	22	4	17	0
4	167	36	19	72	20	116	2
5	178	25	36	77	14	143	0
6	10	3	2	3	0	6	0
7	23	2	7	4	1	12	0
8	21	0	0	4	10	26	0
9	3	0	0	3	0	1	0
10	8	6	0	0	0	4	0

The accident data revealed several points of concern. Over the entire study corridor, 9 of the 11 fatalities occurred in Segment 1. **Figure 2-6** shows that all of the accident rates calculated for US 60 by milepost between MP 227.00 and MP 242.00 exceeds the statewide average of 0.79 acc/MVM for similar types of facilities. This segment is characterized as being a two-lane rural highway over mountainous terrain.

The accident rates calculated for each milepost also isolates particular problem areas on Segment 1. **Figure 2-6** shows high accident rates occurring at:

- MP 228.00 (Queen Creek Canyon)
- MP 238.00 (Pinto Creek)
- MP 246.00 (Intersection with SR 88)

These high accident rate locations are triple the statewide average for similar facilities.

For the urban segments (see **Figure 2.7**), the accident data shows that while number of fatal accidents is lower than the rural segments, the number of multi-vehicle accidents such as angle, rear-end, and left-turning accidents increases. The two fatalities on Segment 4 involved left-turn type collisions.

Spikes in the accident rate by milepost generally occur at intersections along the corridor.

2.3 PROPOSED ROADWAY IMPROVEMENTS

2.3.1 Rural Segments

The current traffic situation on US 60 is such that significant improvements to the roadway are warranted. Several enhancements to the existing roadway were considered that would improve the LOS, as follows:

- Adjust the vertical and horizontal alignment to increase passing sight distances
- Improve passing opportunities by adding additional passing/truck climbing lanes
- Widen the roadway to four lanes

A roadway that is constructed with structurally adequate paved shoulders can be used to assist in dispersal and breakup of platoons. Slower moving vehicles may temporarily use the shoulder to permit faster vehicles to pass, returning to the travel lane when passing maneuvers have been completed.

Climbing lanes are a spot improvement, applied mostly on steep, sustained grades that cause heavy vehicles to travel at slow speeds. This reduces capacity, creates platoons, and increases delay. Criteria outlined in the *Highway Capacity Manual* that warrant truck-climbing lanes include:

1. Upgrade traffic flow rate exceeds 200 vph.
2. Upgrade truck flow rate exceeds 20 vph.
3. One of the following conditions exist:
 - a) Level of Service E or F exists on the grade.
 - b) A reduction of two or more levels of service is experienced when moving from the approach segment to the grade.
 - c) A 10-mph or greater speed reduction is experienced for a typical heavy truck.

Criteria 1 and 2 are met based on the current and design year projections. The results of the existing highway capacity analyses indicate that Criteria 3a warrant is met within both Segments 1 and 2 for existing conditions.

Criteria 3b was not analyzed since the separate analysis of approximately 164 existing vertical curves requires considerable effort.

Criteria 3c requires analysis of specific grades. The *Highway Capacity Manual* requires that any grade more than 3 percent and longer than 0.5 miles, must be analyzed as a separate segment. The existing grades were reviewed and five specific locations met the requirements to be analyzed as a separate segment. Four of the locations already have climbing lanes striped and can be lengthen slightly to extend over the entire upgrade. There is a 1-mile westbound upgrade near the east end of Segment 1 that has no climbing lane (MP 241.69 to MP 242.83) and meets the criteria for a climbing lane.

An additional HCS analysis was completed to determine the effect of the following highway capacity improvements:

- Increasing shoulder widths to 8 feet
- Increasing the available passing distance (APD) to 80% of the available distance
- Adding a lane in each direction of travel

The level of service for an improved two-lane roadway did not improve from LOS E in Segment 1 for the 2002 traffic volumes and LOS F for the 2025 traffic volumes. Nor did the LOS change in Segment 2 from LOS E for the year 2002 traffic volumes and LOS F for the year 2025 traffic volumes. However, analysis of a four-lane divided section through Segments 1 and 2 indicate that additional lanes in both directions would increase the level of service to within an acceptable operating condition. The results are shown in **Table 2-11**.

Table 2-11 Level of Service Summary Change for Segments 1 and 2 Improvements

Roadway Improvements	Segments	
	1	2
	MP 226.85 to MP 242.82	MP 242.82 to MP 243.65
LOS Study Year 1998 2-lane 80% APD	F	E
LOS Current Year 2002 2-lane 80% APD	E	F
LOS Design Year 2025 2-lane 80% APD	F	F
LOS Design Year 2025 4-lane Divided Section	A/B	B/B

A/A – Level of service in both directions for multilane highway

2.3.2 Urban Segments

The level of service analysis for urban segments indicated that traffic operations on Segment 6 would be at LOS F for 2025. The analysis also showed that Segment 6 operations would degrade to LOS D or worse by the year 2009. Additional HCS analysis was performed on the urban segments to determine whether a six-lane section with a continuous left-turn lane would improve the level of service to an acceptable level. The analysis concluded that a seven-lane section for Segment 6 would increase the levels of service to LOS E and D (for both directions). This improvement is not within acceptable levels. The results are shown on **Table 2-12**.

Table 2-12 Level of Service Summary Change for Segments 3 through 9 Improvements

Roadway Improvements	Segments					
	3	4	5	6	7	8
	MP 243.65 - 244.66	MP 244.46 - 247.06	MP 247.06 - 249.60	MP 249.60 - 250.05	MP 250.05 - 251.94	MP 251.94 - 252.23
LOS Study Year 1998 Existing Section	A/A	B/A	B/B	C/C	B/B	B/B
LOS Current Year 2002 Existing Section	B/A	B/A	B/B	C/C	B/B	B/B
LOS Design Year 2025 Existing Section	D/C	D/C	E/D	F/F	D/D	D/C
LOS Design Year 2025 5-Lane Section	C/C	D/C	E/D	F/F	D/D	D/C
LOS Design Year 2025 7-Lane Section	B/B	C/B	C/C	E/D	C/B	C/B

A/A – Level of service in both directions for multilane highway

2.3.3 Recommendations

US 60 within the limits of this project has two main characteristics. For most of its length, it is a two-lane rural highway through mountainous terrain (Segments 1-2). The results of a level of service analysis and review of accident data indicate that this portion of the facility already performs at low operating levels and that accidents occurring within this area are high in rate and severity. It is recommended that this portion of the roadway be widened to four lanes. Several issues were considered in arriving at this conclusion:

- The traffic projections used with the study are based on historical data, which does not consider the added traffic resulting from an improved facility. The model also does not incorporate growth that may result within the Globe-Miami areas as new developments are being proposed in these towns to combat the congestion that is being experienced in the Phoenix metropolitan area. Any significant increase in the design year ADT would further validate the requirement for four lanes throughout to achieve a LOS of B.
- A four-lane divided facility is a safer roadway by separating opposing traffic and does not necessitate passing opportunities using opposing lanes. The divided roadway also offers the opportunity to control turning traffic (median crossovers) for increased safety, operational efficiency, provides better access control, and is more appropriate for the rural mountainous area.

- The existing two-lane highway can be improved with the addition of passing / climbing lanes and adjustments to the vertical and horizontal alignments. However, the improved two-lane highway will still operate well below the desired LOS B for the design year.

Other improvements that could be considered are:

- Increased illumination within urban/populated areas
- Increased signage of roadway curvature or hazards
- Reduction in roadway curvature
- Increase shoulder widths and lateral clearance to obstructions

Following the rural, mountainous terrain, the balance of the project (Segments 3-8) is a multi-lane urban highway through rolling terrain. At approximately MP 244, US 60 widens and becomes initially a four-lane urban section for one mile, and then a five-lane urban section with a center turn lane for the balance of the project. In some (limited) areas, the typical section could be widened to provide continuous left turn lanes throughout, and add a through lane in each direction.

Widening the roadway within the urban limits will not be easy as much of the existing highway R/W is just outside the existing roadway section. In these areas, development exists directly adjacent to the sidewalk. To widen in these areas would require the acquisition of many buildings, parking spaces, and developed lands. In some areas, these adjacent buildings are listed on the National Register of Historic Places and are therefore protected. Lastly, some portions of the

roadway (Segment 6, in particular) will still fall short of the desired LOS for the design year even after additional lanes are included. In part this is due to the heavy volume, but is also due to the numerous and closely spaced driveways and streets, and many signalized intersections.

Since most of the traffic that is using the roadway between MP 244 and 255 is local traffic, realignment of US 60 outside of the developed Globe/Miami area appears to be a better solution. This solution will relocate the regional traffic onto a new divided roadway that can meet the traffic demands of the next 20-years and beyond.

As an effort to reduce the congestion and improve the LOS within the urban area until a new alignment can be constructed, there are several interim improvements that could be considered that include:

- Limiting access to right-in/right-out driveways
- Driveway consolidation
- Increased signalization of high demand intersections for increased safety for turning vehicles